What is Claimed:

1. A speech encoder comprising:

a first weighting means for performing an error weighting on a speech input, said first weighting means configured to reduce an error signal resulting from a difference between a first synthesized speech signal and said speech input;

a means for generating the first synthesized speech signal from a first excitation signal;

a second weighting means for performing an error weighting on the first synthesized speech signal, said second weighting means also configured to reduce the error signal resulting from the difference between the speech input and said first synthesized speech signal;

a first difference means for taking the difference between the first synthesized speech signal and the speech input, said first difference means configured to produce a first weighted error signal;

a means for generating a second synthesized speech signal from a second excitation signal;

a third weighting means for performing an error weighting on the second synthesized speech signal, said third weighting means configured to reduce a second weighted error signal resulting from the difference between the first weighted error signal and said second synthesized speech signal;

a second difference means for taking the difference between the second synthesized speech signal and the first error signal, said second difference means configured to produce the second weighted error signal;

a feedback means for using the second weighted error signal to control the selection of the first excitation signal, and the selection of the second excitation signal

2. The speech encoder of claim 1, wherein error weighting performed by the first, second, and third weighting means are different for at least two of said first, second, and third weighting means.

3. The speech encoder of claim 2, wherein the first excitation signal is selected from a first predetermined set of excitation signals and multiplied by a first selectable gain factor that is based on a first gain estimation.

4. The speech encoder of claim 3, wherein the second excitation signal is selected from a second predetermined set of excitation signals and multiplied by a second selectable gain factor that is based on a second gain estimation.

5. The speech encoder of claim 4, wherein the feedback means uses the second weighted error signal to control the first gain estimation and the second gain estimation.

6. The speech encoder of claim 2 further comprising an estimation means for estimating a pitch of the speech input, wherein said pitch is used to control the selection of at least one of the first and second excitation signals.

7. The speech encoder of claim 6 further comprising a means for filtering the speech input, wherein said filtering comprises low pass filtering such that the low frequency portion of the speech input is emphasized more than the high frequency portion in a resulting filtered speech signal.

8. The speech encoder of claim 7, wherein the filtered speech signal is used by the estimation means in order to estimate the pitch.

9. The speech encoder of claim 8, wherein said means for filtering the speech input is adaptive so that the filter characteristics change based on the shape of the speech input.

10. The speech encoder of claim 8, wherein an input to the means for filtering the speech input is coupled to the output of the first weighting means.

11. The speech encoder of claim 8, wherein the means for filtering the input incorporates a fourth weighting means that performs error weighting on the speech input.

12. The speech encoder of claim 11, wherein the error weighting performed by the fourth weighting means is different from the error weighting performed by the first weighting means.

13. A speech encoder comprising:

a first error weighting filter configured to accept a speech signal as input, to output a weighted speech signal, and to minimize a magnitude of a first weighted error signal generated by taking the difference between said weighted speech signal and a first weighted synthesized speech signal;

a first signal path configured to generate a first synthesized speech signal;

a second error weighting filter coupled with the first signal path, said second weighting filter configured to generate the first weighted synthesized speech signal from the first synthesized speech signal and configured to minimize the magnitude of the first weighted error signal generated by taking the difference between the weighted speech signal and said first weighted synthesized speech signal;

a first subtractor coupled with the first and second error weighting filters, said first subtractor configured to take the difference between the weighted speech signal and the first weighted synthesized speech signal and to output the first weighted error signal;

a second signal path configured to generate a second synthesized speech signal;

a third error weighting filter coupled with the second signal path, said third error weighting filter configured to generate a second weighted synthesized speech signal from the second synthesized speech signal and configured to minimize a magnitude of a second weighted error signal generate by taking a difference between the first weighted error signal and said second weighted synthesized speech signal;

a second subtractor coupled with the first subtractor and the third weighting filter, said second subtractor configured to take the difference between the first weighted error signal and the second weighted synthesized speech signal, and to output a second weighted error signal; and

a feedback means coupled to the second subtractor, said feedback means configured to use the second weighted error signal to control the generation of subsequent first and second synthesized speech signals.

14. The speech encoder of claim 13, wherein the weighting provided by the first, second, and third error weighting filters is different for at least two of said first, second, and third error weighting filters.

15. The speech encoder of claim 14, wherein the first signal path comprises:

a first codebook configured to allow a first excitation signal to be selected and output from said first codebook;

a first multiplier coupled with the first codebook, said first multiplier configured to multiply the first excitation signal by a first gain term, and

a first synthesizing filter coupled with said first multiplier, said first synthesizing filter configured to synthesis the first excitation signal into the first synthesized speech signal after said first excitation signal has been multiplied by the first gain term.

16. The speech encoder of claim 15, wherein the second signal path comprises:

a second codebook configured to allow a second excitation signal to be selected and output form said second codebook;

a second multiplier coupled with the second codebook, said second multiplier configured to multiply the second excitation signal by a second gain term, and

a second synthesized filter coupled with said second multiplier, said second synthesizing filter configured to synthesis the second excitation signal into the second synthesized speech signal after said second excitation signal has been multiplied by the second gain term.

17. The speech encoder of claim 16, wherein the feedback means controls the generation of the first and second synthesized speech signals by using the second weighted error signal to control the selection of the first excitation signal, the selection of the second excitation signal, the first gain term, and the second gain term.

18. The speech encoder of claim 13 further comprising a pitch estimator configured to estimate the pitch of the speech signal and used to control the generation of at least one of the first and second synthesized speech signals.

19. The speech encoder of claim 18 further comprising a filter for filtering the speech signal such that the low frequency portion of said speech signal is emphasized more than the high frequency portion.

20. The speech encoder of claim 19, wherein the pitch estimator is coupled to the filter and uses the output of said filter to perform the pitch estimation.

21. The speech encoder of claim 20, wherein the filter is adaptive so that the filter characteristics change based on the shape of the speech signal.

22. The speech encoder of claim 20, wherein an input to the filter is coupled to the output of the first error weighting filter

23. The speech encoder of claim 20 wherein the filter incorporates a fourth error weighting filter for performing error weighting on the speech input.

24. The speech encoder of claim 23, wherein the error weighting performed by the fourth error weighting filter is different than the error weighting performed by the first error weighting filter.

25. A method of speech encoding comprising:

a) performing error weighting on a speech signal to create a weighted speech signal;

b) generating a first synthesized speech signal from a first excitation signal multiplied by a first gain term;

c) performing error weighting on the first synthesized speech signal to create a weighted first synthesized speech signal;

d) taking the difference between the weighted speech signal and the weighted first synthesized speech signal in order to generate a first error signal;

e) generating a second synthesized speech signal from a second excitation signal multiplied by a second gain term;

f) performing error weighting on the second synthesized speech signal to create a weighted second synthesized speech signal;

g) taking the difference between the first error signal and the weighted second synthesized speech signal in order to generate a second error signal; and

h) using the second error signal to control the generation of subsequent first and second synthesized speech signals.

26. The method of claim 25, wherein the error weighting performed in steps (a), (c), and (f) are different for at least two of the steps.

27. The method of claim 25 further comprising performing pitch estimation on the speech signal and using the pitch estimation to control the generation of at least one of the first and second synthesized speech signals.

28. The method of claim 27 further comprising low pass filtering the speech signal and using a filtered version of the speech signal for the pitch estimation.

29. The method of claim 28, wherein the low pass filtering is adaptive based on the energy spectrum of the speech signal.

30. The method of claim 28, wherein low pass filtering also incorporates performing error weighting on the speech signal.

31. A transmitter comprising:

a speech input means configured to receive a voice input signal;

a speech encoder coupled with said voice input means, said speech encoder configured to generate parameters associated with a synthesized speech signal that represents the voice input signal, said speech encoder including:

a first error weighting filter configured to accept a speech signal as input, to output a weighted speech signal, and to minimize a magnitude of a first weighted error

signal generated by taking the difference between said weighted speech signal and a first weighted synthesized speech signal;

a first signal path configured to generate a first synthesized speech signal;

a second error weighting filter coupled with the first signal path, said second weighting filter configured to generate the first weighted synthesized speech signal from the first synthesized speech signal and configured to minimize the magnitude of the first weighted error signal generated by taking the difference between the weighted speech signal and said first weighted synthesized speech signal;

a first subtractor coupled with the first and second error weighting filters, said first subtractor configured to take the difference between the weighted speech signal and the first weighted synthesized speech signal and to output the first weighted error signal;

a second signal path configured to generate a second synthesized speech sample;

a third error weighting filter coupled with the second signal path, said third error weighting filter configured to generate a second weighted synthesized speech signal from the second synthesized speech signal and configured to minimize a magnitude of a second weighted error signal generate by taking a difference between the first weighted error signal and said second weighted synthesized speech signal;

a second subtractor coupled with the first subtractor and the third weighting filter, said second subtractor configured to take the difference between the first weighted error signal and the second weighted synthesized speech signal, and to output a second weighted error signal; and

a feedback means coupled to the second subtractor, said feedback means configured to use the second weighted error signal to control the generation of subsequent first and second synthesized speech signals; and

a transceiver coupled with said speech encoder, said transceiver configured to transmit the parameters through a transmission means.

32. The transmitter of claim 31, wherein the weighting provided by the first, second, and third error weighting filters is different for at least two of said first, second, and third error weighting filters.

33. The transmitter of claim 32 further comprising a pitch estimator configured to estimate the pitch of the speech signal and used to control the generation of at least one of the first and second synthesized speech signals.

34. The transmitter of claim 33 further comprising a filter for filtering the speech signal such that the low frequency portion of said speech signal is emphasized more than the high frequency portion.

35. The transmitter of claim 34, wherein the pitch estimator is coupled to the filter and uses the output of said filter to perform the pitch estimation.

36. The transmitter of claim 35, wherein the filter is adaptive so that the filter characteristics change based on the shape of the speech signal.

37. The transmitter of claim 35, wherein an input to the filter is coupled to the output of the first error weighting filter

38. The transmitter of claim 35 wherein the filter incorporates a fourth error weighting filter for performing error weighting on the speech input.

39. The transmitter of claim 38, wherein the error weighting performed by the fourth error weighting filter is different than the error weighting performed by the first error weighting filter.

40. The transmitter of claim 32, wherein the transmission means is a telephone line or an antenna.

41. The transmitter of claim 32, wherein the voice input means is a microphone or telephone line.

42. The transmitter of claim 32, wherein said transmitter is included in one of the following communication devices: a telephone, a cellular phone, a pager, a cordless phone, a digital answering machine and a personal digital assistant.